PART 3
POTENTIALLY IMPACTED SPECIES

3.1 BLACK-FOOTED FERRET

Though never common, black-footed ferrets once ranged over most of west-central North America as far north as Alaska. Historically, its range was almost identical to the range of three species of prairie dogs: black-tailed, Gunnison's, and white-tailed (USFWS 1988a). The slaughter of prairie dogs in the early 1900's, agricultural cultivation, and sylvatic plague have severely reduced the range and abundance of prairie dogs, which nearly resulted in the extinction of the black-footed ferret (USFWS no date-a). The black-footed ferret was listed as endangered in March 1967[1] under a law that preceded the ESA.

The black-footed ferret is nocturnal and extremely cryptic (Whitaker 1980). It lives in arid prairies in proximity to prairie dog colonies. Black-footed ferrets feed primarily on prairie dogs (90%) and utilize their burrows for dens. Large prairie dog towns are needed to support viable populations of ferrets. However, numerous small prairie dog towns may support ferrets, if the ferrets can move easily between them.

Four to five young are born in May or June. The young stay in the burrow until they are about 6 weeks old. By September the young have become increasingly solitary. Sexual maturity is reached at age 1 to 1.5 years. Life expectancy is probably less than 5 years (USFWS 1988a).

By 1972 the black-footed ferret was thought to be extinct. However, in 1981 a dog killed a black-footed ferret on a ranch near Meeteetse, Wyoming, which led to the discovery of a small ferret population. The population was closely monitored from 1982 to 1984. An advisory board was established in 1982 to determine what actions were needed to encourage the recovery of the ferret. Mark and recapture surveys and radio telemetry data estimated the population as 88 in 1983 and as 129 in 1984. In September 1984, the board suggested that a captive breeding program be established (USFWS 1988a).

In October 1985, six ferrets were taken into captivity for breeding. During the fall of 1986 and the spring of 1987, the last of 18 known wild ferrets were taken from the wild and placed into captivity (USFWS 1988a). A captive-breeding program was started at Sybille Canyon, Wyoming (now known as the National Black-footed Ferret Conservation Center). The original goal of the program was to establish 240 breeding adults in captivity and continue their return to the wild (USFWS no date-b).

A taskforce was put together in 1996 to make recommendations to USFWS. The long-term goal is to establish 10 free ranging populations of black-footed ferrets that each has a population made up of 30 or more breeding adults. By the year 2010, it is hoped that 1,500 free-ranging black-footed ferrets will live in the wild (USFWS 1988a, USFWS no date-b).

Project Area

According to available information compiled by Clark (1978), the Wyoming Game and Fish Department (WGFD) (Kinter and Martin 1992), USFWS (Jobman and Anderson 1991), Wyoming Natural Diversity Database (WNDDB 1999), and South Dakota Natural Heritage Database (SDNHDB 1998), historical evidence exists for black-footed ferrets within the project area. In South Dakota the following sightings or physical evidence exists for black-footed ferrets: 3 in Custer County, 2 in Fall River County, 5 in Pennington County and 3 in Shannon County. In Wyoming the following sightings or physical evidence exists for black-footed ferrets: 16 in Campbell County, 14 in Converse County, 6 in Niobrara County, and

[1] Federal Register, March 11, 1967, 32(48):4001.

6 in Weston County. Some of these sightings were rated by the various sources as "confirmed," "positive," or "probable" but most are farther than 20 miles from any project alternative. Those closer than 20 miles are listed in Table 3-1. Only three of these, (records of 2 skulls and 1 skin), are unquestionably physical evidence.

The USFWS's recent Biological Opinion in regards to the Continental Divide/Wamsutter II proposed project states that since Wyoming is relatively unique in retaining vegetation and wildlife communities largely unchanged from pre-settlement times extant populations of black-footed ferrets may still exist (USFWS 2000). Therefore, there is the chance of the discovery of an extant population of the species.

Table 3-1
Reports of Black-footed Ferrets
(within an approximate 20 mile distance of the project area)

County, State	Year Observed	Location Description or T R Sec	Distance from Alternative	Observation Rating
Pennington, SD	1921	3S 12E 17	1 mile, B & C	Not Rated /1
	1927	2S 9E 08	11 miles, C 6 miles, D	Not Rated /1
Fall River, SD	1980	near the city of Edgemont	<2 miles, B & C	Probable /2
	1983	9S 3E 07	<1 mile, B	Confirmed /2
Custer, SD	1984	6S 9E 17-20	1 mile, B & C	Probable /2
	1988	55N 5E 26	13 miles, C	Probable /2
Weston, WY	1895	near the city of Newcastle	<2 miles, D	Positive, Skin /3
	1910	near the city of Newcastle	<2 miles, D	Positive, Skull /3
	1930	18 mi. southwest of Upton on Deep Water Creek	18 miles, D	Positive /3
	1920-35	46N 65W 22-23	15 miles, D	Not Rated /1
	1972	5 miles S. Hwy 16 by South Dakota	4 miles, D	Not Rated /1
	1972	5 mi. south of Hwy 16 on South Dakota border	2 miles, D	Positive /3
Niobrara, WY	1976	36 miles N. Lusk, Hwy 85	12 miles, B & C	Confirmed /2
Crook, WY	1930	Four Horse Creek, south of Moorcroft	6-15 miles, D	Positive /3
	1971	Middle-Osage Comm. Pasture	> 10 miles, D	Positive /3
	1973	3 miles east Crook Co. line, 8 mile north I-90.	8 miles, D	Probable /3
	1977	Hwy 14 near Keyhole Res.	8 miles, D	Not Rated /1
Converse, WY	1972	41N 69W 21	<1 mile, B	Possible/Probable /1
	1979	41N 70W 32	<1 mile, B & C	Positive, Skull /1, 3
	1983	39N 71W SE 1/4	10 miles, B & C	Possible/Probable /1
Campbell, WY	1972	41N 69W 26	1 mile, C	Possible/Probable /1
	1974	43N 73W 05	16 miles, B & C	Confirmed /2
	1976	43N 70W 30	1.5 miles, B & C	Possible/Probable /1
	1976	43N 73W 24	13 miles, B & C	Possible/Probable /1
	1981	43N 72W 02	6.5 miles, B & C	Probable /1
	1981	43N 72W 11	9 miles, B & C	Confirmed /2
	1986	43N 70W 30	1 mile, B & C	Possible/Probable /1
	1987	45N 71W 23	5.5 miles, C	Possible/Probable /1

Notes:
1 Ratings of Possible/Probable not differentiated by Kinter and Martin, 1992
2 Ratings of Confirmed or Probable provided by USFWS 1981 and update (Jobman and Anderson, 1991)
3 Ratings of Positive or Probable from Clark, 1980
3 Information with no observation ratings from South Dakota Natural Heritage Database, 1998

Experimental populations of black-footed ferrets have been reintroduced to federally managed lands in South Dakota from 1994 through 1997. In 1996 reintroduction began in the Conata Basin/Badlands which are within portions of the BGNG and Badlands National Park. All black-tailed prairie dog colonies within the reintroduction area were mapped. Data obtained from the mapping indicates lower densities (number of prairie dogs per acre) on the periphery of core reintroduction areas (USFWS unpub. info.). Therefore, densities of black-tailed prairie dog colonies are low on BGNG that would be closest to the proposed project area.

The Black-footed Ferret Recovery Implementation Team has identified Thunder Basin National Grasslands (TBNG) as a high-priority reintroduction site for black-footed ferrets. The USFS has worked with The Nature Conservancy to block up USFS ownership in the vicinity of Rosecrans, south of the alternatives for this project. These blocked-up USFS lands would form the core of the TBNG's ferret reintroduction site. If the site is successful, ferrets may expand to prairie dog towns that would be crossed by the alternatives.

3.2 PIPING PLOVER

The piping plover is one of six belted plovers found in North America. Piping plover populations have declined dramatically since the early 1900's (USFWS 1994a). Decline of piping plovers in the Missouri River basin has been related to construction of dams and reservoirs that alter water flows making nesting habitat unavailable, river channelization that alters river hydraulics that likewise adversely affect nesting sites on unvegetated islands and sandbars, bioaccumulation of selenium, and human recreational use of nesting areas during the breeding period (Dinsmore 1983, Kruse et al. 1993). These population declines prompted USFWS to list the piping plover under the ESA in December 1985[2]. Piping plovers breeding on the Great Plains were listed as threatened, while those breeding on the Great Lakes were listed as endangered.

Piping plover arrive on the breeding grounds between mid-April and mid-May (Prindiville-Gaines and Ryan 1988, Haig and Oring 1985, Wiens 1986). The piping plover utilizes sandbars, sand pits, and gravel pits for nesting. Sandbar habitats used by this species are transient and dependent on the dynamic forces of the river. Sandbars used for nesting change from year to year as erosion and deposition by the river break down and reform sandbars, or vegetation encroaches. Additionally, during some years, no sandbars are exposed because of high flows. Some plovers have adapted to these changing conditions by shifting to sand pits along the river. While these areas do not necessarily provide optimal nesting habitat, they do provide the opportunity for some individuals to successfully reproduce when river sandbars are unavailable.

For sandbars to be successful nesting sites, they must be free of vegetation and surrounded by sufficient water to limit access by predators. Therefore, an optimal flow regimen must exist which is sufficiently high to create new sandbars in spring, low enough during the breeding season to expose the sandbars, but not so low that the sandbars become joined to adjacent terrestrial habitats. The magnitude of the optimal flow regimen may differ from year to year depending on the location, shape, and height of the sandbars created previously.

Males and females begin courtship and construct several nest scrapes which consist of shallow depressions scratched in the sand or gravel and frequently lined with small pebbles or shells (Haig 1992, USFWS 1994a). Eggs are laid beginning in May. One egg is laid per day for four days. Incubation lasts for 25 to 31 days (Wilcox 1959, Cairns 1977, Prindiville 1986, Wiens 1986, Haig and Oring 1988). Eggs hatch from late May to mid-June. Chicks are precocial (capable of moving around on their own soon after hatching) and able to leave the nest and begin feeding themselves within several hours (USFWS 1994a). Broods generally remain within the parents' territory. Chicks fledge between 21 and 35 days (Haig and Oring 1988, Wilcox 1959). Plovers generally start departing the breeding grounds in mid-July and are gone by the end of August (Wiens 1986).

[2] Federal Register, December 11, 1985, 50(238):50726-50734.

Piping plovers feed on a variety of invertebrates that they capture by picking and gleaning. Food taken includes worms, insects, crustaceans, mollusks, beetles, and grasshoppers (Bent 1929, Lingle 1988). Foraging activity generally occurs within a few inches either side of the water's edge.

Project Area

The piping plover only occurs in the project area during the breeding and nesting season. They have been recorded near Pierre, South Dakota on islands or sandbars in the Missouri River (SDNHDB 1998). Searches for piping plovers along the Cheyenne River and Lake Oahe revealed their presence but none were found nesting on sandbars in the Cheyenne River during 1986 and 1987 (Dirks et al. 1993a). Searches were conducted for piping plovers along 20 miles of the Cheyenne River in Custer and Pennington counties in 1994, but no evidence for the species was found (Hetlet 1994). Likewise, no piping plovers were observed during a survey conducted along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota on June 26, 1999. Water flow rates measured at a USGS gauging station downstream of Wasta, South Dakota (Table 3-2) indicated that suitable nesting habitat for piping plovers was unavailable on this section of the river in 1999. USGS flow rate data indicates that suitable nesting habitats on sand bars and islands on the Cheyenne River have probably been submerged and/or scoured during the month of May, when the birds usually begin nesting, in 10 out of 15 years between 1983 and 1998.

Table 3-2
River Flow Data at 3 USGS Gauging Stations on the Cheyenne River, South Dakota
(in vicinities where interior least terns were observed nesting compared to river flows recorded before, during and after a survey for interior least terns and nesting piping plovers on June 26, 1999)

	River Flows (Cubic Feet per Second) at Gauging Stations (with USGS Station Numbers) on the Cheyenne River, South Dakota		
Interior Least Tern Observed Nesting Date	06423500-Downstream from Wasta, Pennington County	06438500-Near Plainview, Ziebach County	06439300-Near Cherry Creek, Ziebach County
June 7, 1986 /1	150	No data	486
June 1986 /2	1338 (June 1986 average)	No data	2,022 (June 1986 average)
August 4, 1987 /1	77	No data	339
June 26, 1988 /3	82	No data	204
June 30, 1995 /3	1,120	2,500 (estimated value)	No data
June 26, 1997 /3	876	No data	No data
June 27, 1997 /3	841	No data	No data
This Survey, Before and After:			
June 22, 1999	3,500 (350 = median for date)	7,500 (925 = median for date)	No data
June 26, 1999	2,300 (250 = median for date)	4,250 (700 = median for date)	No data
June 28, 1999	1,880 (9300 = median for date)	3,780 (675 = median for date)	No data

Notes: /1 data from South Dakota Ornithologists' Union, 1991, nesting on lower Cheyenne River near mainstream of Missouri River.
/2 observation reported by Michael Melius, Hermosa, South Dakota nesting on Cheyenne River island between Rapid Creek.
/3 data from SDNHDB, 1999, nesting on Cheyenne River in northern Pennington County near Haakon County.

3.3 WHOOPING CRANE

The whooping crane is found only in North America. Historically, its range extended from the Arctic coast south to central Mexico and from the Rocky Mountain region in Utah eastward to the Atlantic coast; but only two natural populations exist today (Tesky 1993). However, recent management actions in the United States and Canada have resulted in a gradual increase in their numbers. The ESA of 1973 (16

USC, 1531-1534;87 Stat. 884) resulted in the establishment of the Whooping Crane Recovery Team and development of the 1994 Whooping Crane Recovery Plan. The whooping crane was listed as threatened in 1967 (32 FR 4001) and as endangered in 1970.

Fall migration begins in September, and whooping cranes normally migrate in small flocks of less than 10. After spending about six months in their wintering grounds, they return to their nesting grounds in the north. Whooping cranes use a variety of habitats during migration such as croplands for feeding and riverine habitat for roost sites (Lingle et al. 1991). Cranes roost on submerged sandbars in wide unobstructed channels that are isolated from human disturbance (Armbruster 1990). Habitats utilized by whooping cranes in South Dakota include marshes, wet meadows, and grain fields near water. Similar habitats are utilized in Wyoming during the cranes' migrations (Ashton and Dowd 1991, Dorn and Dorn 1990). Large palustrine wetlands are also used for roosting and feeding during migration. Whooping cranes' diet includes crustaceans, amphibians and invertebrates (Allen 1952).

Today, most whooping cranes migrate from Wood Buffalo National Park in Canada to Aransas National Wildlife Refuge on the Texas coast. This route passes southeastward through northeastern Alberta, south central Saskatchewan, northeastern Montana, western North Dakota, western South Dakota, central Nebraska and Kansas, west central Oklahoma, and east central Texas. Scattered occurrences have been reported in adjacent states and provinces (USFWS 1994b).

In December 1993, there were approximately 261 whooping cranes. Until several years ago, whooping cranes occurred in western Wyoming (Ritter 1990). These birds were from the experimental flock from the Grays Lake National Wildlife Refuge in Idaho, which was initiated in 1975 as an experiment to cross-foster whooping crane eggs in nests of sandhill cranes (USFWS 1986a). The cross-fostering program was discontinued in 1989 and there are only 2 birds from the Grays Lake flock known to be alive in 1999. The wild populations consist of the Aransas/Wood Buffalo population, the only self-sustaining natural wild population; the reintroduced Florida population in the Kissimmee Prairie; and the Rocky Mountain population (USFWS 1994b). The largest captive population of 41 birds, including nine breeding pairs, is located at the Patuxent Research Refuge near Laurel, Maryland.

The need for protection and restoration of prime habitat along the migration corridors was identified by the USFWS in 1981. River management plans along the Platte River have been implemented to protect and maintain roosting sites in wetland meadows and marshes adjacent to the river channel. Human activity near these sites is restricted during the migration periods. Protection of instream flows in areas where impoundments and dams are present has been addressed, and studies of the effects of disturbance have been conducted in the wintering areas. The reduction in mortality for whooping cranes may be achieved through the minimization of the risks of chemical spills near critical habitat and reduction of the risk of collision with utility lines and fences. Utility lines are the principle known cause of loss during migration (USFWS 1994b). Collisions with utility lines are known to have accounted for the death or serious injury of at least 19 whooping cranes since 1956. Restrictions of detrimental human activities such as construction periods, aircraft altitude and flight path, and recreation in habitat areas may also provide benefit.

Project Area

The migration path of the Aransas/Wood Buffalo flock that nests in northern Canada and migrates to the Gulf of Mexico passes through central and western South Dakota, mainly in the Missouri River basin (Binkley and Miller 1988, Ashton and Dowd 1991). From 1957 through 1990, there have been 5 confirmed sightings of whooping cranes from Beadle County, 14 sightings from Hughes County, 20 sightings from Stanley County, 2 sightings from Haakon County, 7 sightings from Jackson County, and 5 sightings from Pennington County (USFWS unpub. data).

During the spring migration in 1988, a small group (4 adults and 1 young) of whooping cranes was observed feeding in a grain field north of Rapid Creek approximately 3 miles from Alternative D in Pennington County. A small group (5) of whooping cranes were observed a week later approximately 11

miles southeast of Wall in eastern Pennington County (SDNHDB 1999). The following year, 1989, one whooping crane was seen flying 3 miles east of Ellsworth Airfore Base in Pennington County during fall migration (USFWS 1989).

3.4 INTERIOR LEAST TERN

The interior least tern is one of three subspecies of New World least terns. The interior least tern was formally listed as federally endangered in 1985[3]. The decline of interior least terns throughout their breeding range in the Mississippi and Missouri river basins has been related to construction of dams and reservoirs that alter water flows making nesting habitat unavailable, river channelization that alters river hydraulics that likewise adversely affect nesting sites on unvegetated islands and sandbars, and human recreational use of nesting areas during the breeding period (Erwin 1983). In addition, bioaccumulation of contaminants in adults, particularly selenium derived from seleniferous soils and shales along the Missouri River, may be sufficient to cause embryo death or deformities (Dinsmore 1983, Kruse et al. 1993).

The interior least tern is a migratory species, breeding along large rivers within the interior of the United States. Interior least terns return to breeding and nesting areas from late April to early June (Faanes 1983, Hardy 1957, Wilson 1984, Wycoff 1960, Youngworth 1930).

Interior least terns nest in colonies on sand islands and sandbars in rivers. A key factor for nest site selection is continuous exposure of the site above water for at least 100 days during the nesting period from mid-May to the end of August (Smith and Renkin 1993). Suitable nesting areas contain little vegetation (less than 10 percent), with the vegetation present being less than four inches tall (Dirks et al. 1993a). Because nests are on the ground near water level they are vulnerable to flooding following natural precipitation pulses but also during hydroelectric dam operational water releases. Nests are also susceptible to avian and mammal predators and human disturbance (Rimmer and Deblinger 1992, Mayer 1993, Krusse et al. 1993, Schwalbach et al. 1993, Smith and Renken 1993). Interior least terns also nest on alkaline flats where they are also susceptable to flooding, predators, and human disturbance (Koenen et al. 1996).

Interior least terns excavate shallow scrapes in sand, soil or gravel (Carreker 1985). Suitable nesting habitat has apparently been created at pits created by sand and gravel mining operations adjacent to the Platte River in Nebraska (Sidle and Kirsch 1993). Once natural vegetation regrowth or reclamation occurs on abandoned pits, their suitability for nesting by interior least terns diminishes (Sidle and Kirsch 1993).

Interior least terns begin laying eggs around the end of May. If a nest of eggs or chicks is lost, the pair may nest a second time. The second nesting may occur as late as mid- to late July (Lingle 1988). Average clutch size is approximately 2.5 eggs per nest (Lingle 1988). Eggs are incubated for 17 to 31 days (Faanes 1983, Hardy 1957, Moser 1940, Schwalbach 1988, Cairns 1977). Chicks are precocial, but depend on their parents for food and care until fall migration (Massey 1972). Chicks fledge at approximately 21 days of age (Kirsch 1990). Parents and chicks will remain in the area of nesting colonies until departing for the winter. By early September, terns have usually left the colonies for southern wintering areas (Bent 1921, Hardy 1957, Stiles 1939).

Sandbar habitats used by interior least terns for nesting are ephemeral; thus, the terns are highly susceptible to loss of nests, eggs, or chicks because of high water. Although nesting usually is initiated during high flow periods causing terns to nest on higher areas of sandbars, Lingle (1988) found flooding to be the main cause of nest loss in riverine habitats. In some areas and during abnormally high or late spring flows, artificial habitats such as gravel and sandpits may provide the only suitable nesting habitat in an area (Lingle 1988). While these areas provide suitable nesting habitat, they require adult birds to fly

[3] Federal Register, May 28, 1985, 50(102)21784-21792.

greater distances to forage and may subject nests and chicks to a greater likelihood of loss from predators or human disturbance (Lingle 1988, Lackey 1994).

In addition to the presence of suitable nesting substrate, nesting sites are selected for presence of food fish such as shiners, suckers, killifish, gizzard shad and sunfish (Erwin 1983, Carreker 1985). Occasionally, crustaceans, insects, mollusks, and annelids may be taken (Whitman 1988). Foraging areas are usually near nesting sites; however, terns may travel several miles to fish (Talent and Hill 1985).

Project Area

Interior least terns occur in South Dakota. Successful nesting has been documented on the Missouri and Cheyenne rivers (Dirks et al. 1993b). Initiation of nesting in South Dakota may be dependent on water levels, occurring earlier during years with low water levels. Nesting usually begins in late May and chicks fledge by mid-July (Schwalbach et al. 1993).

Suitable nesting sites and foraging areas apparently occur along the Cheyenne River near its confluence with the Missouri River at Lake Oahe (Dirks et al. 1993a), upstream from Pierre, South Dakota. Two records of interior least terns on the Missouri River in the vicinity of Pierre, Hughes County and Fort Pierre, Stanley County were provided by SDNHDB (1998) but there were no records in the project area. Biologists with the BGNG conducted a search for interior least terns along 20 miles of the Cheyenne River in Pennington and Custer counties in 1994 but no evidence of the birds was found (Hetlet 1994). However, interior least terns were observed nesting on an island in the Cheyenne River in 1986, approximately midway between the confluence with Rapid Creek and Wasta, South Dakota (Melius 1999).

From 1988 through 1997, least terns have nested along the Cheyenne River in Pennington County several miles downstream from where the river is crossed by Alternative D (SDNHDB 1999). There are sand and gravel bars in the Cheyenne River where it parallels Alternatives B and C upstream from the Alternative D crossing but most are small and some partially covered with vegetation and may not be suitable for nesting (Hetlet 1994).

Interior least terns are known to nest along the Cheyenne River, upstream from its embayment at Oahe Reservoir but their occurrence farther upstream where the river parallels the proposed project is unknown. Mud, sand and gravel bars in the Cheyenne River have been mapped from 1:2400 scale aerial photographs in the area where the river is adjacent to both alternatives. The suitability of those sites for nesting by interior least terns has not been determined. Inundation frequencies prior to and during the nesting period, amount of vegetation cover established on bars, local abundance of food fish (fish less than 4 inches long) and concentration of predators all affect site suitability as nesting habitat (Carreker 1985). Minimum habitat areas required for nesting sites are unknown but small colonies of interior least terns have nested on a 0.22-acre island and 0.45-acre sandbar (Carreker 1985). These areas are larger than most potential nesting sites in the project area.

As part of this project a survey for interior least terns and piping plovers was conducted in June 1999 along approximately 28 miles of the Cheyenne River between Spring Creek and Wasta, South Dakota. No interior least terns were seen. During the survey, USGS water flow data on the river at Wasta, South Dakota (Table 3-2) indicated flows of 2,300 cubic feet per second (cfs). Many of the sand and gravel bars in the survey area had been under water several days prior to the survey, probably on June 22, 1999 when flows reached 3,500 cfs.

Comparisons of flows on the June 26, 1999 survey date with flows recorded at the Wasta USGS gauging station and other stations downstream on the Cheyenne River indicate much lower water flows on dates when least terns had been observed nesting in the past. Thus, during the June 26, 1999 survey water levels may have been too high for nesting to be initiated or sustained successfully.

3.5 TOPEKA SHINER

The Topeka shiner once inhabited waterways in Kansas, Iowa, Minnesota, Missouri, Nebraska, and South Dakota. The fish now occupies less than 10 percent of its original geographic range. Remaining populations inhabit small tributaries in several states including Minnesota and South Dakota (Tabor 1998, American Rivers 1997, USFWS no date-c). Much of the decrease has occurred over the past 25 years. The decline is due to increased sedimentation, eutrophication (enrichment of water in dissolved nutrients as in phosphates and often shallow with a seasonal deficiency in dissolved oxygen) and the introduction of piscivorous (fish eating) fish. Increased sedimentation and eutrophication can be attributed to human activities such as agriculture, water use, impoundment of water in lakes, construction of watering ponds, urban development, and highway construction (Cross and Collins 1995, American Rivers 1997). The USFWS designated the Topeka shiner as endangered under the Endangered Species Act on December 15, 1998[4].

The Topeka shiner inhabits clear, clean open pools near headwaters of streams having bottoms composed of sand, gravel or rubble. Most of these streams are perennial; however, some streams may cease flowing during dry seasons, but permanent pools are maintained by the percolation of water through the streambed. The fish feed on midge larvae, aquatic insects, and other organisms found on stream bottoms (Cross and Collins 1995, American Rivers 1997, Pflieger 1975).

The green sunfish is the most common predator inhabiting the Topeka shiner range. Introduction of game fish such as largemouth bass, crappie, white bass, northern pike, and channel catfish may affect the shiner during drought periods when the fish seeks refuge in impoundments or permanent stream pools occupied by these introduced fishes (Tabor 1998).

The Topeka shiner is reported to spawn over green sunfish and orange-spotted sunfish nests. Males establish territories around nests. Spawning occurs from late June to August with the young maturing in one year. Their life span is between two to three years (Cross and Collins 1995). Little else is known regarding breeding habits and development (Tabor 1998).

Land use practices, maintenance of altered waterways, and continuing tributary impoundment and channelization represent the greatest existing threats to the Topeka Shiner. Additionally, over-grazing of riparian zones and the removal of riparian vegetation diminish a watershed's ability to filter sediments, organic wastes, and other impurities from the stream system resulting in increased sedimentation and eutrophication (Manci 1989).

Project Area

In Minnesota the Topeka shiner has been found in Flandreau and Spring creeks (Lincoln County) which are crossed by the existing rail line. The fish may also inhabit tributaries to these creeks. The MNHDB has a 1973 record of the species from Lincoln County approximately 1 mile from the DM&E existing right-of-way. In South Dakota, as recently as 1997, the shiner was found in two streams in Brookings County (Tabor 1998). Recent collections of Topeka shiners have been made in the Big Sioux River watershed that includes the Medary, Deer, Sixmile and North Deer creeks and their tributaries in Brookings County. In Beadle and Kingsbury counties the Topeka Shiner has been recorded from the James River water shed which includes Middle Pearl and Pearl creeks and their tributaries (USFWS 1998 unpub. data). Cain Creek in Beadle and Hand counties is a potential Topeka shiner stream. Additionally, there are tributaries to Topeka shiner streams that cross the proposed project area in Hand County, South Dakota. This species was collected in the late 1960's from the Cheyenne River embayment at Lake Oahe. However, none have been reported in collections made since then.

No surveys have been completed for Topeka shiners near any of the new railroad alternatives in South Dakota.

[4] Federal Register, December 15, 1998, 63(240):69008-69021.

3.6 PALLID STURGEON

Despite being one of the largest freshwater fish in North America, the pallid sturgeon was not described as a species until 1905 (Forbes and Richardson 1905). Before that, pallid sturgeon were considered to be a different color morph of shovelnose sturgeon. The relatively late recognition of the sturgeon as a distinct species may have been because it was never very common. Pallid sturgeon are only rarely captured and the species may be close to extinction (USFWS 1993a). On September 6, 1990, the pallid sturgeon was listed as federally endangered (55 FR 36647).

Pallid sturgeon are a big river species. The fish is generally noted as a species of the Missouri River and its major tributaries (Keenlyne 1989). They occur within the mainstem of the Mississippi River downstream from its confluence with the Missouri River, the mainstem of the Missouri River as far upstream as Fort Benton, Montana, and the lower stretches of several major tributaries to these rivers. River stretches where pallid sturgeon have been recorded generally include turbid, swift waters with firm sand or gravel substrate (Bailey and Cross 1954).

USFWS (1993a) estimated sexual maturity for males to occur between ages 5 and 7. Females were estimated to begin egg development at 7 to 9 years of age, with sexual maturity not being reached until between age 15 and 20. Pallid sturgeon are believed to spawn only once every several years.

Pallid sturgeon are assumed to spawn between March and July, depending on location (Forbes and Richardson 1905, Gilbraith et al. 1988, Keenlyne and Jenkins 1993, Keenlyne 1996). Eggs are very adhesive and attach to bottom substrates and remain unattended until hatching (Keenlyne 1996, Gilbraith et al. 1988). Upon hatching, the larvae are buoyant and active and disperse with the current (Moyle and Cech 1982).

Project Area

Records of pallid sturgeon were provided by SDNHDB (1998). The records were from the Missouri River in Pierre, Hughes and Stanley counties (Lake Sharpe) between 1967 and 1989. The sturgeon is native to the Missouri and Mississippi rivers and persists in Lake Sharpe, South Dakota (Dryer and Sandvol 1993). Since pallid sturgeons prefer main channels of large, turbid rivers where they feed on fish and aquatic insects along the bottom (Kallemeyn 1983), suitable habitat does not exist in the vicinity of the alternatives paralleling the Cheyenne River. No evidence from any surveys exists for their occurrence in the Cheyenne River (Hampton 1998, USFWS 1993a)

3.7 AMERICAN BURYING BEETLE

The American burying beetle once ranged throughout the entire eastern United States and portions of extreme southeastern Canada (Anderson and Peck 1985). Historically, these areas were covered by vast expanses of mature deciduous forest. Portions of the species' western range also included tall- and short-grass prairie. The range and occurrence of the American burying beetle have declined significantly. Habitat loss (Anderson and Peck 1985) and forest fragmentation (NGPC 1995) appear to be the most likely reasons for decline. Because of the dramatic decline of the species and the probable extinction of the species throughout much of its historic range, the American burying beetle was listed as federally endangered in July 1989[5].

American burying beetles are active from late April through September (USFWS 1991). The American burying beetle is nocturnal and is generally active only when nighttime temperatures exceed 60 degrees Fahrenheit for several consecutive days. After emerging, adults set out in search of suitable carrion for brood production (Scott and Traniello 1989).

American burying beetles are the largest member of the genus and therefore capable of using larger carrion than other members of the genus. Optimal carrion size is 3.5 to 7.0 ounces (USFWS 1991a). A pair of American burying beetles will bury a carcass and the female will deposit her eggs above it. After

[5] Federal Register, July 13, 1989, 54(133):29652-29655.

the eggs hatch, the larvae fall from the egg chamber onto the carcass and as they grow, the parents actively feed or assist the larvae in feeding themselves (Milne and Milne 1976, Wilson and Fudge 1984, Fetherson et al. 1990).

The adults remain with their brood until the larvae pupate. At that time the young burrow into the soil. The pupated larvae emerge in 48-60 days as adults capable of reproducing. Adults emerging early in the season may successfully reproduce during the remaining year (Lomolino et al. 1994). Others will over-winter until the following season (USFWS 1991a, Kozol et al. 1988).

Preferred habitat for the American burying beetle has not been determined (Ratcliffe and Jameson 1992, Raithel 1991, Kozol et al. 1988). However, a variety of habitats have been suggested including riparian woodlands with rich humus, mixed agricultural land, and grasslands (Ratcliffe and Jameson 1992, Raithel 1991, Jameson and Ratcliffe 1989). However, grasslands are seldom used as breeding habitats because litter is nearly absent and grassland soils are often compacted, making carcass burial difficult (Lomolino and Creighton, 1996). American burying beetles have been found in the sandhills of northcentral Nebraska where there is sufficient carrion, even though sandy soils may make carcass burial difficult (Ratcliffe and Jameson, 1992). Recent studies in Oklahoma and Arkansas suggest American burying beetles prefer mature upland forest with low shrub growth, followed by grasslands (Lomolino et al. 1994). These studies also seem to indicate that the American burying beetle is more of a generalist, using a wider range of habitats than other burying beetles and that the presence of appropriate soil for carcass burial was more important than habitat type.

Project Area

The SDNHDB (1998) has a record of the beetle's occurrence in Brookings County within 1 mile of the existing railroad; however, no date was given. The USFWS lists records of the species occurrence in Brookings, Haakon, and Union counties for 1946. There is also an historic record (no date) of specimens collected near Nowlin and Haakon counties (Backlund and Marrone 1997, Lomolino et al. 1995). That collection site is the most western extension of the beetle in South Dakota and was apparently within the immediate vicinity of the existing rail line in the Bad River floodplain.

The existing railroad passes through nearly 51 miles of herbaceous rangeland and 4 miles of deciduous forest lands in South Dakota. These may be suitable for American burying beetles as well as the nearly 228 miles of right-of-way that traverses croplands and pastures in the state. Although the new railroad alternatives are farther west than the known range of the species (recent searches in Badlands National Park and Wind Cave National Park were unsuccessful - Backlund 1999), each alternative would affect herbaceous rangeland, forested (cottonwood) wetlands, croplands and pastures in varying amounts.

Given the proximity of collections in Cherry County, Nebraska and that the beetle is a strong flier and can travel long distances in search of carrion, they may be present in suitable habitats (USFWS 1991). At this time, any habitat in South Dakota with significant humus and/or topsoil suitable for burying carrion is considered potential beetle habitat.

3.8 MINNESOTA DWARF TROUT LILY

Minnesota dwarf trout lily occurs in woodland habitat, adjoining floodplains dominated by elm and cottonwood and on rich slopes where maple and basswood are dominant. It is the only plant species known to be endemic to Minnesota and probably has always been considered rare. It requires rich, moist areas in undisturbed forests. It is a glacial relict only occurring in Steele, Rice, and Goodhue counties in Minnesota. With increased urban sprawl, additional lands being used for agriculture and logging, the few remaining populations could be threatened. It is believed that the plant establishes new populations by becoming uprooted during high waters and being carried downstream. Conversion of floodplains to croplands reduces the possibility of establishment of new populations downstream and can erode the soils

and increase siltation in the areas the lily now inhabits (Sather no date). Minnesota dwarf trout lily was listed as a federally endangered species on March 26, 1986[6].

The plant's unusual reproduction strategy could be another factor contributing to its rareness. The Minnesota dwarf trout lily almost never produces seeds. It grows from an underground bulb. Population size increases when the underground stem of a flowering plant produces a single offshoot runner bearing a new bulb. Because only a small proportion of plants flower in any given year, only about one-tenth of all plants actually produce offspring (Sather no date).

It is believed that the Minnesota dwarf trout lily evolved from the white trout lily shortly after the last glaciation. Floodwaters could have uprooted the plants from their original location along the Cannon River and redeposited them downstream. This would account for the plant's limited geographical range at elevations of 960 to 1000 feet within the Cannon River watershed and tributaries (Sather no date).

Project Area
Most colonies of the Minnesota dwarf trout lily occur along a 7.5 miles stretch of the Straight and Cannon Rivers near Faribault, Minnesota. This area is approximately 15 miles upstream of the proposed construction in Owatonna, Minnesota.

3.9 HIGGIN'S EYE PEARLY MUSSEL

The Higgin's eye pearly mussel is a freshwater mussel. The present distribution o Higgin's eye pearly mussel is the St. Croix River, Wisconsin River and upper Mississippi River from Pool 6 to Pool 20. The mussel is found in waters of the states of Minnesota, Wisconsin, Iowa and Illinois. Between 1890 and 1920, Higgin's eye pearly mussel was one of many species heavily harvested to make mother-of-pearl buttons and pins. Higgin's eye pearly mussels initially may have declined due to commercial harvesting. However, impoundments, decreasing water quality, and channel dredging are the primary factors responsible for recent declines (USFWS 1983). Contemporary threats include pollution from agricultural and industrial runoff. By 1982, data indicated that this species had undergone a 53% decrease in its known range (USFWS 1997a). On June 14, 1976, it was listed as federally endangered (41 FR 24064).

The mussel inhabits areas of swift current, where it buries itself in mud-gravel bottoms. Depth of water is approximately 15 feet. The mussel leaves only the edge of its shell and its feeding siphons exposed. Reproduction requires a stable, undisturbed habitat, and a sufficient population of sauger and freshwater drum that play host to Higgin's eye larvae. When the male discharges sperm into the current, females downstream siphon in the sperm in order to fertilize their eggs, which they store in their gill pouches until the larvae hatch. The females then expel the larvae. Those larvae which manage to attach themselves to the gills of a host fish grow into juveniles with shells of their own. At that point, they detach from the host fish and settle into the streambed. They may live up to 50 years (USFWS no date-d).

Project Area
The mussel is found in the Mississippi River downstream from the Twin Cities and some of its larger northern tributaries. Although several collections of mussels have been made in the Minnesota River, South Fork of Zumbro River, and Straight River (tributary to the Cannon River) in the vicinity of the proposed project, no Higgin's eye pearly mussels have been collected in the project area (MNHBD 1998).

3.10 WINGED MAPLE LEAF MUSSEL

The historic range of the winged maple leaf covered eleven states in the north central portion of the United States; however, it has been eliminated from 99% of this range (Eldridge 1991). Siltation, chemical and agricultural pollution, and the damming of rivers to create reservoirs have eliminated the winged maple leaf from areas where it once existed. Currently the only known population exists in the St. Croix River, Wisconsin. The population in the St. Croix appears to be very small and localized, making it prone to stochastic (random) disturbances. Additional threats to the remaining population include

[6] Federal Register, March 26, 1986, 51(58):10521-10523.

expanded agricultural or modified land use, toxic substance spills, point discharges of harmful chemicals, low water levels, and large recreational boat traffic. It was listed as a federally endangered species by the USFWS on June 20, 1991 (56 FR 28349).

The winged maple leaf mussel is found in shallow gravel bars or riffles of medium to large clear-water rivers and streams. It buries itself in the gravel, sand or mud with only its feeding siphons exposed. Reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete the mussel's larval development. When the male discharges sperm into the current, females downstream siphon in the sperm in order to fertilize their eggs, which they store in their gill pouches until the larvae hatch. The females then expel the larvae. Those that manage to find a fish host to clamp onto by means of clasping valves, grow into juveniles with shells of their own. At that point they detach from the host fish and settle into the streambed. An adult mussel may live up to 50 years (USFWS 1997b).

Project Area
The only known extant population in the Midwest occurs in the St. Croix River, Wisconsin. This population occurs just below the St. Croix Falls Dam and is approximately 125 miles upstream of Winona, Minnesota (Hornbach et al. 1996).

3.11 KARNER BLUE BUTTERFLY

The Karner blue butterfly occupies oak barren/savanna habitats where wild lupine grows. The plant serves as host for several of the insect's larval stages. Historically, the butterfly occurred in a narrow band extending from eastern Minnesota, across portions of Wisconsin, Illinois, Indiana, Michigan, Ohio, Canada, Pennsylvania, New York, Massachusetts, and New Hampshire. Since 1992 it has been extirpated from Ohio, Pennsylvania, and Massachusetts. The species decline can be attributed to the loss of habitat because of suppression of wildfires, development, and clearing of land for agricultural purposes (USFWS no date-e, Mitchell and Carnes no date). Today the butterfly is restricted to a few isolated spots where lupine is present (Scheider 1998). The butterfly was listed as endangered on December 14, 1992[7].

The butterfly produces two broods a year. In April, larvae hatch from the eggs that over-wintered from late summer of the previous year. The larvae enter the pupa stage, and emerge from their pupas as adult butterflies during the end of May and early June. The newly hatched adults mate and lay their eggs during June on or near wild lupine plants. The eggs hatch within a week and the larvae feed on the lupine for about three weeks. The larvae then pupate and emerge as adult butterflies in July. This generation will mate and lay eggs that won't hatch until the following spring (Scheider 1998). Winter snowpack protects the eggs from freezing; therefore, the range of the Karner blue only overlaps with the range of wild lupine where there is sufficient winter snowpack (USFWS no date-e).

Declining habitat suitability and size has accelerated the rate of localized population extinction. Additionally, Givnish et al. (1988) estimate that maximum dispersal distance for colonization of unoccupied habitats is approximately 0.5 miles. Since optimal habitats have become increasingly fragmented due to succession and alteration, colonization has become increasingly difficult (Shuey 1997).

Project Area
The butterfly has been recorded from the Whitewater Wildlife Management Area, Winona County in Minnesota. This area is approximately 3 miles from the existing DM&E rail line to be rebuilt. In 1998 the Minnesota County Biological Survey (MCBS) surveyed DM&E's existing line in Minnesota. No federally listed species were found during the survey. (However, due to the unique nature of working within active railroad rights-of-way, combined with the relatively short duration of the project, several important issues regarding data interpretation and limitations must be noted: 1) Time constraints precluded MCBS botanists from timing surveys in order to maximize the chances of observing rare species. Therefore, unobserved rare species may occur in these rights-of-way and not be reflected in the data, 2) Safety concerns of railroad companies strictly forbade field staff to cross the railroad track, except

[7] Federal Register, December 14, 1992, 57(240):59236-59244.

at public crossings; and 3) Time constraints precluded field staff from essentially conducting the survey twice. As a result, the survey effort rarely included both sides of the track. Although the inventory could not be repeated, botanists observed both sides of the right-of-way and took general notes, which are available with other survey data, and 4) There is great variation in the width of the railroad rights-of-way. The above limitations prevent area calculations from MCBS data therefore the 1998 results are linear (MDNR 1999)). Additionally, information provided from the MNHDB did not report wild lupine occurring in the proposed project area. Since no wild lupine was reported from either source, it is doubtful that Karner blue butterflies exist within the proposed project area.

The existing route in southeastern Minnesota partially coincides with oak savanna/barrens, so Karner blue butterflies could be present or in the vicinity of the existing railroad (Aaseng et al, 1993). There are approximately 4.9 miles of existing railroad that coincide with deciduous forests in Winona County but, if no wild lupine occurs within the right-of-way, it is doubtful that Karner blue butterflies exist within the proposed project area.

3.12 UTE LADIES'-TRESSES ORCHID

Suitable Ute ladies'-tresses orchid habitat is becoming uncommon with increased disturbances to stream systems and conversion of land to urban uses. Total population of Ute ladies'-tresses has declined to approximately 20,500 individuals. Geographic distribution of the plant includes the eastern Great Basin of western Utah and adjacent Nevada, the Colorado River drainage of eastern Utah, the eastern slope of the Rocky Mountains in southeastern and central Wyoming, south central Idaho and Montana. In eastern Wyoming, the orchid is known from Converse, Goshen, Laramie and Niobrara counties. It has not been recorded from South Dakota (Intermountain Ecosystems 1998). Ute ladies'-tresses orchid was listed as a federally threatened species in February 17, 1992[8].

The orchid flowers from late July through August depending on location and climatic conditions. However, the plant may not flower every year. *Spiranthes magnicamporum*, another species of Spiranthes, has been reported to bloom as rarely as once in every 20 years (Magrath 1973). Bumblebees are the main pollinators. Fruits of the orchid appear during late August through September (Dresler 1981, Sheviak 1984, Sipes et al. 1993, USFWS 1995a).

Ute ladies'-tresses orchid generally occurs between 4,300 to 7,000 feet in seasonally moist soils such as wet meadows, old stream channels, and seeps (Stone 1993). Suitable habitat includes open vegetation that is not densely overgrown or overgrazed. However, it may occur in grazed pastures with introduced grasses or in heavily disturbed sites that have been revegetated. The plant is flood tolerant and prefers well-drained soils with high moisture content, such as fine silt/sand to gravel and cobbles. It is not tolerant of extremely saline/alkaline soils (> 8.0 pH) or of long term standing water (USFWS 1995a). Plants often occur in clumps of two or more. White sweetclover (*Melilotus alba*), arrowgrass (*Triglochin* spp.), creeping bentgrass (*Agrostis stolonifera* L.), and baltic rush (*Juncus* spp.) are some of the plant species that appear to occur with the orchid in Wyoming (Hazlett 1996).

Project Area

Searches for Ute ladies'-tresses along the alternatives were conducted in South Dakota and Wyoming in September 1998. Because access to potential sites on private lands was restricted, only 22 sites could be adequately evaluated with four considered potential habitat for the species (Intermountain Ecosystems 1998). The four sites were at Hay Canyon South and Dry Creek in South Dakota (Fall River County) and at Lodgepole and School creeks in Wyoming (Weston County) (Table 3-3). Additionally, much of the proposed project area in the range of Ute ladies'-tresses orchid is substantially below 4,300 feet. The report prepared for the survey is included as Appendix .

[8] Federal Register, January 17, 1992, 57(12):2048-2053.

Table 3-3
Habitat Potential and Site Index for *Spiranthes diluvialis*

Site Name	USGS Quad/Legal Description	NWI Maps	Plant Association	Direct Access to Row	Potential Habitat
Box Elder Creek	Wasta, SD T1N, R14E, NE4, S31	R2UBA	cottonwood, sandbar willow	No	No
Spring Creek	Scenic SW, SD T2S, R12E, SW4, S29; NE4, S31	PEMA	cottonwood, sandbar willow	No	No
Battle Creek	RedShirt, WY T3S, R10E, NW4, S31	PEMA	cottonwood, American elm	No	No
French Creek	Fairburn NE, SD T5S, R9E, S5	PEMCH	no data	No	No data
Cheyenne River at Hay Canyon	Smithwick, SD NE/T7S, R8E, S1	R2UBG	cottonwood, sand vcbar willow, cordgrass	Yes	No
Hay Canyon North	Smithwick, SD NE/T7S, R8E, S12	PEMC	cordgrass, cattails	Yes	No
Hay Canyon South	Smithwick, SD NW/T8S, R8E, SE4, S2	PEMA, PUBH	cattails, bulrush, cordgrass	No	Yes
Sand Creek	Smithwick, SD T8S, R8E, NW4, S31	PEMC	cottonwood, plum	No	No
Horsehead Creek	Lone Well Creek East, SD T9S, R7E, S21	PEMA, PUB	cottonwood, red ash, cordgrass	No	No
Dry Creek	Lone Well Creek West, SD T9S, R6E, NE4, S29	PEMA	cattails, cordgrass, threesquare bulrush	Yes	Yes
Hat Creek	Heppner, SD T9S, R4E, SW4, S25	PEMA	cottonwood, cordgrass, wildrye	Yes	No
Plum Creek	Rumford, SD T9S, R4E, S31	PABFH	no data	No	No data
Red Canyon Creek	Edgemont, SD T8S, R3E, NW4, S29	PEMC	cottonwood, sand sagebrush	No	No
Beaver Creek	Twenty One Divide, WY T7S, R1E, S16	PEMC	cordgrass	No	No
Bobcat Creek	Riverview, WY T40N, R61W, S9	PEMA	sagebrush	No	No
Alkali Creek	Little Alkali Creek, WY T40N, R62W, S4	PEMA	greasewood, alkali sacaton	Yes	No
Lodgepole Creek	The Nose East, WY T42N, R64W, SW4, S32	PEMC	baltic rush, threesquare bulrush, cordrush	Yes	Yes
Lion Creek	Darlington Draw East, WY T42N, R67W	PEMA	sagebrush	No	No
Piney Creek	Darlington Draw West, WY T42N, R68W, S2	PEMA	sagebrush, cottonwood	No	No
Little Thunder Creek	Piney Canyon NW, WY T43N, R69W, SW4, S30	PEMA, PABFH	cordgrass	No	Low
School Creek	Piney Canyon NW, WY T42N, R69W, NW4, NE4, S6	PABFH	cordgrass	Yes	Yes
West Fork of Beckwith Creek	Piney Canyon SW, WY T41N, R69W, NE4, S8	PEMB, PABH	sagebrush	No	No
Black Thunder Creek	Open A Ranch, WY T44N, R70W, S14	PABFH	sagebrush	No	Low
East Fork Coal Creek	Rough Creek, WY T45N, R70W, S11	PEMAH	no data	No	No data
Dry Creek	Saddle Horse Butte, WY T47N, R70W, S29	PEMAH	no data	No	No data
Belle Fourche River	Saddle Horse Butte, WY T47N, R70W, S30	PEMAH, PEMCH	no data	No	No data
Caballo Creek	Saddle Horse Butte, WY T48N, R71W, S35	PEMCH, PABFH	no data	No	No data

3.13 PRAIRIE BUSH-CLOVER

Prairie bush-clover is one of twelve North American bush-clovers. It inhabits dry open areas in glaciated regions of Illinois, Iowa, Minnesota, and Wisconsin (Smith 1981). The plant grows on soils that are usually well drained. The largest populations of the plant occur in southwestern Minnesota and northwestern Iowa. Contributing factors to the decline of Prairie bush-clover include agricultural development, highway expansions, pipeline easements, and herbicide use (USFWS 1988b). The plant was listed as a federally threatened species on January 9, 1987[9].

Prairie bush-clover is found in coarse soils on north-facing slopes of 10-15 degrees. The plant tolerates disturbance well, occurring on rights-of-way and places which have been exposed to fires (Fernald 1950, Gleason and Cronquist 1963, Gleason 1952, Sather 1986, Clewell 1966a, Smith 1981). Prairie bush-clover reproduces by seed. Both chasmogamous (cross-pollinating) and cleistogamous (self-pollinating) flowers are produced (Clewell 1966b, Sather 1986). It appears reproductive success is more dependent on self pollinating flowers, than the pollinator dependent flowers (Sather 1988). Germination of the clover occurs from mid-May to mid-July with formation of leaf buds forming from late May through late August. Flowering occurs from July through August. Fruiting is from mid-August through September with seed dispersal occurring from mid-September through to the following summer (Sather 1986, Smith and Sather 1986). The pollinator is unknown at this time.

Project Area

Prairie bush-clover is known to occur in Brown, Dodge, Olmsted and Redwood counties in Minnesota. It has been recorded as recently as 1997 in Dodge County within 1 mile of the existing line (MNHDB 1998). In Brown County, between 1988 and 1992, eight sites were reported. Two of these sites were on cut-banks of former Chicago and Northwestern railbeds and another site found in 1992 was where DM&E's existing tracks intersect the Chicago and Northwestern track. These 3 sites are within MDNR Cottonwood Prairie Scientific and Natural Area, approximately 3 miles southwest of Springfield in Brown County (MNHDB, 1998).

The MCBS inventoried the entire DM&E rail line in Minnesota (278 miles) for prairie fragments and rare features. Thirty-six total miles of prairie within the right-of-way were identified. Prairie bush-clover was not found within DM&E right-of-way during the 1998 survey. (However, due to the unique nature of working within active railroad rights-of-way, combined with the relatively short duration of the project, several important issues regarding data interpretation and limitations need to be addressed: 1) time constraints precluded MCBS botanists from timing surveys in order to maximize the chances of observing rare species. Therefore, unobserved rare species may occur in these rights-of way and not be reflected in the data, 2) Safety concerns of railroad companies strictly forbade field staff to cross the railroad track, except at public crossings. Time constraints precluded field staff from essentially conducting the survey twice. As a result, the survey effort could rarely include both sides of the track. Although the inventory could not be repeated, botanists could observe both sides of the right-of-way and took general notes, which are available with other survey data, and 3) There is great variation in the width of the railroad rights-of-way. The above limitations prevent area calculations from MCBS data therefore the 1998 results are linear (MDNR 1999)).

3.14 LEEDY'S ROSEROOT

Leedy's roseroot is found in six locations in Minnesota and New York. Four populations are found in Filmor and Olmsted counties, Minnesota and the other two are found in upstate New York. Only one of the six populations occurs on Minnesota public land. The plant was listed as a federally threatened species on April 22, 1992[10].

Leedy's roseroot is found on limestone cliffs. Cracks in the limestone lead to underground caves where groundwater seeps to the surface and cool air provides a cool and wet environment for the species. The

[9] Federal Register, January 9, 1987, 52(6):781-785.
[10] Federal Register, April 22, 1992, 57(78):14649-14653.

caves often connect with sinkholes above ground and usually uphill. In Minnesota ground water contamination is the greatest threat to the continued survival of the plant (USFWS 1993b, Harrison 1992). The source of contamination can be from application of fertilizers and pesticides being applied to nearby fields and lawns and through filling or dumping in sink holes adjacent to the cliffs (USFWS 1998, Harrison 1992). Flowering occurs in early June. Bees and syrphus flies appear to be the pollinators (Clausen 1975). The seeds are wind dispersed.

Project Area

The plant has been recorded growing high on limestone cliffs along the Root River in Olmsted County. All Minnesota sites are found in drainages of the Root and Whitewater rivers at elevations between 900 and 1,240 feet. Neither river is in the proposed project area. Additionally, no suitable habitat for the species has been identified within the proposed project area.

3.15 WESTERN PRAIRIE FRINGED ORCHID

The western prairie fringed orchid historically occurred throughout central North America. It was found within the western Central Lowlands (U.S.), eastern Great Plains (U.S.), and Interior Plains (south-central Canada) (Lobeck 1957, Brownell 1984). In the United States, western prairie fringed orchids are known historically from 81 counties in 8 states. These states are North Dakota, South Dakota, Minnesota, Iowa, Nebraska, Kansas, Missouri, and Oklahoma. Currently, the species is believed extirpated from South Dakota and Oklahoma, and has been significantly reduced in areas of occurrence in Iowa, Kansas, Missouri, and Nebraska. Although the species has been found in 28 new counties since 1970, it has been found to no longer occur in approximately 75 percent of the original counties of occurrence (USFWS 1995b). The majority of populations of western prairie fringed orchids in the United States are located in the Red River Valley of North Dakota and Minnesota. Decline in the species is due to several factors such as conversion to cropland, overgrazing, intensive hay mowing, and draining of wetlands (Harrison 1989). The western prairie fringed orchid was listed as a federally threatened species by the USFWS on September 28, 1989[11].

Flowering occurs sporadically. A plant may flower several consecutive years, not flower for several years, or flower at random years over its lifetime. Exactly what stimulates flowering is unknown. However, it is proposed that flowering may be caused by burning (Bowles 1983, Bowles and Duxbury 1986), above average precipitation, and/or the number of growing degree days (Pleasants 1994). Flowering may last for up to 3 weeks, with individual flowers lasting up to 10 days.

Throughout its range the western prairie fringed orchid occurs in a variety of habitats. These include mesic portions of tallgrass prairie, sedge meadows, loess prairies, hay meadows and at the edge of wetlands. Prairies where the orchid is known to occur are dominated by typical tallgrass species which include big bluestem, little bluestem, and Indian grass. Within these areas, western prairie fringed orchids usually occur in the wetter areas where tufted hairgrass and switchgrass are common. Sedge meadow communities include sedges, rushes, and willows (USFWS 1995b). Although tallgrass prairie and sedge meadows appear to be the preferred habitat, western prairie fringed orchids have been found in non-climax communities. These communities include borrow areas, abandoned fields, and along roadways. These occurrences may indicate that some disturbance in an area, such as fire or intense grazing, may be necessary for orchid establishment (USFWS 1995b).

Project Area

The orchid was previously recorded from Dodge and Nicollet counties in Minnesota, although a search of the MNHDB did not result in any records of the western prairie fringed orchid occurring in the proposed project area (1998). Additionally a survey by the MCBS in 1998 along the existing DM&E rail line did not result in occurrences of the orchid (1999).

[11] Federal Register, September 28, 1989, 54(187):39857-39863.

3.16 BALD EAGLE

The bald eagle is a large bird of prey. It occurs throughout North America and once maintained breeding populations in Canada, Alaska, and 45 of the lower 48 states. It is the only sea eagle regularly occurring on this continent (AOU 1983). Bald eagle populations declined in the nineteenth and twentieth centuries because of hunting, trapping, habitat loss, development, mercury poisoning and organochlorine insecticides (Grier et al. 1983). In some areas of the historic breeding and nesting range, disturbance caused by human development may prevent current and future eagle nesting (Murphy 1965, Retfalvi 1965, Juenemann 1973, Weekes 1974, Grubb 1976, Anthony and Isaacs 1989), as well as result in abandonment of wintering areas (Stalmaster and Newman 1978, Knight and Knight 1984, Smith 1988).

The decline in bald eagle numbers prompted the species listing as federally endangered in 1978. Through research, conservation, management, and protection, the species population within the lower 48 states is increasing, as has its breeding range (Federal Register 1999). Since 1963, when the earliest census of the bald eagle's breeding population was taken (450 nesting pairs), there has been a ten-fold increase (USFWS 1995c). Improvements in the species status led to it being down-listed to federally threatened in July 1995 (60 FR 36010). On July 6, 1999 the USFWS proposed to remove the bald eagle from the List of Endangered and Threatened Wildlife.

Bald eagles may live as long as 30 years (Grier et al. 1983) with sexual maturity being obtained at 4 to 6 years of age. Mortality of juvenile birds is thought to be high and dependent on available winter habitat and the severity of winter weather. After surviving one or two winters, continued survivorship of immature eagles becomes more likely (Sherrod et al. 1977).

Once sexually mature, bald eagles may still not breed for several years. Bald eagles tend to use the same area for nesting in successive years and often use the same nest. Nests may reach considerable size, measuring several feet in diameter and depth and weighing several hundred pounds. As a result, bald eagles generally nest in large trees with strong branches or on rock cliffs (Sherrod et al. 1977).

A minimum of one square mile of essential habitat around a nest is considered necessary to successfully raise young (Grier et al. 1983). Nesting activities begin in late winter or early spring, depending on the latitude. One, two or occasionally, three eggs are laid. Fledging of chicks occurs approximately four months after eggs are laid.

The bald eagles' primary food source is fish (Grier et al. 1983). Both live and dead fish are eaten. Because of the bald eagles reliance on fish, nesting occurs in proximity to large water bodies, including lakes, rivers, and oceans.

Wintering bald eagles are found throughout the United States, but are most abundant in the Midwest and west. Each year, thousands of eagles winter in Utah, Colorado, South Dakota, Nebraska, Kansas, Oklahoma, and Missouri. These seven states account for over 90 percent of the bald eagles recorded during midwinter surveys in the Midwest and west, and nearly half the eagles counted nationwide (Grier et al. 1983).

Suitable wintering areas require an abundant and easily available food supply and cover for protection from the cold. Specific food items consumed by wintering bald eagles vary by geographic area and availability of items (Steenhof 1978). In western Wyoming, bald eagles consume carcasses of mule deer and domestic livestock (Jenkins 1982) including big game killed by trains and vehicles (Reeve unpub. data). Importance of big game and livestock carrion to wintering bald eagles in the Powder River Basin of northeast Wyoming have also been documented by Anderson and Patterson (1988). Thus, wintering

eagles may spend considerable time away from water in search of food. At night, bald eagles will select areas offering protection from the wind and severe weather. These areas are often dense stands of trees in areas where the topography helps afford protection from the elements.

Disturbance of a roost may lead to abandonment of the site (Steenhof 1976, Hansen et al. 1981, Keister 1981). Skagen (1980) reported that almost 43% of wintering eagles along the Skagit River flushed when approached within 500 meters by boats, people or vehicles. Bald eagle nesting territories in the Greater Yellowstone Ecosystem (GYE) and elsewhere have been abandoned as a result of human activities (GYE Bald Eagle Working Team 1983). One study indicated that nesting bald eagles flushed from nests when approaching humans were an average of 1,500 feet from the nest (Fraser et al. 1979).

Project Area

The bald eagle is a winter and nesting resident in the proposed project area. It is known to use lands adjacent to the project area for feeding, perching, and roosting. In Minnesota along the existing line the MNHDB reported nesting bald eagles in Winona County in 1997 along the spillway in the Upper Mississippi River Wildlife and Fish Refuge approximately 8 miles south of the city of Winona. Another report was recorded in 1994 along the Minnesota River north of Mankato in Nicollet County.

USFWS has monitored bald eagle communal roosts and winter concentration areas along the Missouri River, upstream and down from the DM&E bridge crossing at Pierre, South Dakota. Three nocturnal roosts (Suiter roost, Riverbank roost and Compton roost) are present within 0.25 and 0.75 mile of the existing line as it crosses the Missouri River on the west bank (USFWS 1991b). Concentrations of wintering eagles have been documented between DM&E's existing bridge at Pierre, South Dakota and Oahe Dam approximately 7 miles downstream of where the existing rail line veers from the Missouri River to pass along Medicine Knoll Creek (USFWS 1991).

Biologists with BGNG conducted ground surveys for bald eagles wintering along the Cheyenne River in South Dakota since 1994 (Hetlet 1995, 1996a, 1997a, 1998). Those survey results are provided in Table 3-4 and indicate considerable variation between years. However, distributions of bald eagles recorded in December of each year, 1994-1997, generally coincide with bald eagles observed during aerial surveys reported here for February 1999.

Available data indicates that bald eagles vacate the middle reaches of the Cheyenne River in South Dakota, at least between Edgemont and Wasta, South Dakota by late March. USFWS conducted an aerial survey of the Cheyenne River on March 26, 1998 (Peterson USFWS-Lake Andes National Wildlife Refuge, Lake Andes, SD unpub. data). Bald eagles were seen near Angostura Reservoir and on the lower reach of the Cheyenne River near its confluence with the Missouri River but none were observed on the middle reach. Similarly, USFS conducted surveys in May 1996 and 1997 along the same portions of the Cheyenne River that were included in December surveys but no bald eagles were seen either year (Hetlet 1996b, 1997b).

Data provided by the Wyoming Natural Diversity Database (WNDDB) listed several sightings of bald eagles within TBNG (WNDDB 1999). Bald eagles have attempted to nest on TBNG at least twice in the past, but both nests were unsuccessful (Byer 1992 unpub. data). Communal roosts in the vicinity of alternatives have been documented on TBNG by USFS (Byer USFS-TBNG unpub. data). Many of these have also been documented on the WGFD WOS as well as other observations of bald eagle winter concentration areas (Table 3-5). With few exceptions, habitats associated with those sites are coniferous woodlands, consistent with results of studies that demonstrate the thermal protection provided by conifers such as ponderosa pine.

Aerial surveys for nesting bald eagles and other raptors were conducted from April 11-13, 1999 along the new railroad alternatives B and C in South Dakota and Wyoming and the rebuild section from Wall, South Dakota (Pennington County) to Blunt, South Dakota (Hughes County). Ground surveys were conducted from April 22-28, 1999 along the remainder of the rebuild section from Winona, Minnesota to Blunt, South Dakota. Only one pair of bald eagles was seen perched near a nest on private land along the Cheyenne River in Wyoming (Weston County) on April 11; however, no follow-up survey was conducted. The site was more than 1 mile from any new railroad alternative.

Results of field surveys conducted in February 1999 along the alternatives are provided in Table 3-6. Most observations were of single eagles perched in deciduous cottonwood trees adjacent to rivers. All eagles that were observed along creeks and rivers were associated with stretches of ice-free water; no bald eagles were seen where water was frozen.

Table 3-4
Observations of Bald Eagles During Winter Surveys
Conducted by BGNG along the Cheyenne River in South Dakota from 1994 through 1997

December 1994			December 1995			December 1996			December 1997		
Number Seen[1]	T R Sec	Distance to Nearest Alternative (miles)[2]	Number Seen	T R Sec	Distance to Nearest Alternative (miles)	Number Seen	T R Sec	Distance to Nearest Alternative (miles)	Number Seen	T R Sec	Distance to Nearest Alternative (miles)
1 imm	3S 12E 19 NE	2.1 - S	1 imm	4S 11E 21 SW	0.5 - B	1 imm	4S 11E 31 NW	0.2 - B	1 ad	3S 12E 08 SE	1.9 - S
1 ad	4S 11E 29 NE	0.2 - B	1 ad	4S 10E 36 NE	0.6 - B	4 ads	5S 9E 27 NW	0.6 - B	1 imm	3S 12E 19 NE	2.0 - S
1 imm	4S 11E 32	0.2 - B	2 ads	4S 9E 13 SE	0.5 - B	2 ads	6S 9E 16 NW	1.8 - B	1 imm	3S 12E 19 NW	2.0 - S
1 ad	NW	0.1 - B	2 ads	5S 9E 27 NW	0.4 - B				1 ad	4S 11E 21 NW	0.4 - B
2 imm	5S 10E 18	0.2 - B	1 imm	5S 9E 27 NW	0.4 - B				2 ads	4S 11E 21 SW	0.5 - B
1 ad	NW	0.1 - B	1 ad	5S 9E 28 NE	0.3 - B				1 imm	4S 11E 28 SW	0.5 - B
1 imm	5S 9E 13 SW	0.4 - B	3 imm	5S 9E 28 SW	0.1 - B				1 ad	4S 11E 28 SW	0.4 - B
1 ad	5S 9E 22 NE	2.2 - B	1 ad	5S 9E 33 NE	0.5 - B				1 ad	4S 11E 32 NE	0.2 - B
1 imm	5S 9E 33 SW	2.2 - B	1 ad	5S 9E 33 NW	0.1 - B				1 ad	4S 11E 31 NW	0.3 - B
	6S 9E 21 SW								3 ads	5S 9E 23 NW	0.2 - B
	6S 9E 21 SW								1 imm	5S 9E 22 NE	0.1 - B
									1 ad	5S 9E 22 NE	0.1 - B
									2 ads	5S 9E 22 NW	0.1 - B
									1 ad	5S 9E 27 NW	0.5 - B
									1 imm	5S 9E 33 NW	0.1 - B
									1 imm	5S 9E 31 SW	0.1 - C
									1 ad	6S 9E 36 SE	0.1 - C
									1 imm	6S 8E 01 NE	0.1 - C

[1] - ad = adult eagle, imm = immature eagle
[2] - Alternative routes are S = Shared, B = Alternative B, C = Alternative C.

Table 3-5
Bald Eagle Winter Roosts and Concentration Sites with 5 or More Eagles Seen During Winter in Wyoming

Date Observed	Number Seen	Habitat (WGFD Code)	T	R	Sec	Approximate Distance to Nearest Alternative (miles)
2/4/83	12	not recorded	40N	69W	13	3.6 - B >8.0 - C
1/15/88	16	1.40 Ponderosa pine savannah	41N	68W	06 NW	2.0 - B 3.4 - C
2/21/83	6	5.11 Basin big sagebrush	41N	68W	34 SW of NE	3.0 - B 6.5 - C
1/18/83 2/4/83 3/27/85 1/5/88 1/9/89	10 15 10 7 17	not recorded not recorded not recorded 1.40 Ponderosa pine savannah 1.80 Pine-juniper	41N	69W	01 NW	2.5 - B 3.2 - C
3/5/79 3/11/79 2/5/80 1/19/82 1/10/83	5 9 12 16 8	not recorded 1.40 Ponderosa pine savannah 1.81 Pinyon pine-juniper 1.80 Pine-juniper not recorded	41N	70W	25 NW of SW	0.2 - B 1.8 - C
3/1/79	12	not recorded	41N	70W	25 SE	0.1 - B 2.5 - C
1/30/81 1/19/82 1/9/85	9 3 8	not recorded 1.80 Pine-juniper 1.40 Ponderosa pine savannah	42N	69W	05 NE of NE	>8.0 - B 1.1 - C
11/7/90	6	1.40 Ponderosa pine savannah	42N	69W	24	3.6 - B 3.8 - C
12/3/80 1/18/83 3/27/85	1 22 2	4.11 Basin big sagebrush not recorded not recorded	43N	69W	01 SW	0.2 - B 4.0 - C
1/30/83	10	not recorded	43N	70W	26	1.5 - B 1.0 - C
1/9/85	6	4.12 Wyoming big sagebrush	43N	71W	25 NW of NE	2.5 - B 2.5 - C
3/2/79 2/23/80	5 7	1.40 Ponderosa pine savannah 1.81 Pinyon pine-juniper	47N	70W	21 NW of SW	1.5 - B 1.5 - C

Wyoming Game and Fish Department Wildlife Observation System

Table 3-6
Observations of Bald Eagles Seen During 1999 Winter Bald Eagle Survey
(Alternatives B and C in South Dakota and Wyoming)

Date Observed	Number/Age Seen	Habitat	State	County	Quad	T R Sec	Lat/Long	Approximate Distance to Nearest Alternative (miles)
2/13/99	1 adult	cottonwood riparian Antelope Creek	WY	Converse	Dugout Creek	41N 70W 33 NE SW SW	43°28.70NN 105°16.76NW	0.1 - C
	1 adult	cottonwood riparian Ha Creek	WY	Campbell	Piney Canyon NW	43N 69W 04 SE SW SW	43°43.56NN 105°09.57NW	< 0.1 - B
	1 adult	cottonwood riparian Robbers Roost Creek	WY	Niobrara	Riverview	40N 61W 09 SW SE NE	43°27.55NN 104°11.24NW	0.3 - C
	1 adult	cottonwood riparian Cheyenne River	WY	Niobrara	Twentyone Divide	40N 60W 20 NE NE NE	43°26.14NN 104°05.04NW	< 0.1 - B & C
	1 adult	Ponderosa pine woodland	SD	Fall River	Rumford	9S 4E 27 NW NW SW	43°14.28NN 103°38.47NW	0.6 - C
2/14/99	1 immature 2 adults	riparain bluff Cheyenne River	SD	Custer	Red Shirt NE	4S 11E 16 SE NW NE	43°42.36NN 102°48.27NW	0.4 - B
	1 adult	cottonwood riparian Cheyenne River	SD	Pennington	Red Shirt NE	4S 11E 10 NE SW NW	43°42.98NN 102°47.48NW	1.0 - B
	1 adult	cottonwood riparian Cheyenne River	SD	Custer	Red Shirt SW	5S 10E 18 NE NE SE	43°37.05NN 102°58.05NW	0.2- B
	3 adults	cottonwood riparian Cheyenne River	SD	Custer	Red Shirt SW	5S 9E 13 SW NE SW	43°36.68NN 102°59.96NW	0.2 - B
	2 adults	cottonwood riparian Cheyenne River	SD	Custer	Fairburn SE	5S 9E 22 NW SW SE	43°35.79NN 103°01.97NW	< 0.1 - B
	1 adult	cottonwood riparian Cheyenne River	SD	Custer	Fairburn SE	5S 9E 28 NE NW NE	43°35.52NN 103°03.06NW	0.3 - B
	1 immature 2 adults	cottonwood riparian Bad River	SD	Jones	Capa NW	2N 27E 17 NW SE SE	44°07.68NN 100°53.42NW	0.7 – existing

3.17 MOUNTAIN PLOVER

The summer range of the Mountain plover once extended over the short-grass prairies of the western Great Plains from northern Montana to southern Mexico. However, both their numbers and range have sharply decreased with loss of breeding and wintering habitats. These losses are attributed to conversion of native prairies to cropland, range management practices, oil and gas exploration, chemical spraying, urban sprawl and prairie dog extermination. Breeding strongholds exist in small areas of native prairie in Montana and Colorado. The plover also breeds in Wyoming, New Mexico, Oklahoma and Texas (NGPC no date-a). The mountain plover is proposed for listing as a threatened species[12].

Mountain plovers inhabit flat, short-grass prairie, and sagebrush grasslands that historically supported large herbivores such as bison and pronghorn antelope (Knopf 1996). In Montana and Wyoming, the plover is closely associated with prairie dog colonies. However, research from Colorado (Graul 1975) and Utah (Ellison 1998) suggests that the occurrence of breeding mountain plovers may be distributed more in relation to other breeding plovers (aggregation of nest sites) rather than apparently suitable habitat. Nests are scrapes on the ground, commonly in exposed areas or may be next to conspicuous objects. Nests may also be lined with materials found nearby such as lichens, grasses, and cow manure chips (Leachman and Osmundson 1990).

Results of a study conducted in northeast Wyoming showed that mountain plovers nested at sites with low or absent shrub growth and where grasses and forbs were also short (Parrish et al. 1993). In that study, mountain plovers seldom nested on prairie dog colonies but adults with broods were seen on colonies (Parrish et al. 1993).

In eastern Wyoming, the birds arrive in April from wintering grounds in southern California and northern Mexico. Eggs are laid from mid-April into early June. The average clutch contains 3 eggs that are dark olive buff with black markings. The incubation period is 29 days during which time there is a high incidence of egg mortality caused by predation, hail, and livestock. Chick mortality is highest the first three days. According to Graul (1976) only half of the chicks reach fledging age of 33-34 days. Chick mortality is attributed to predation, poor nutrition, disease, and separation from the adult (Leachman and Osmundson 1990).

Young mountain plovers reach sexual maturity at one year of age and probably breed for two years. Some birds return to the same nesting area each year and some chicks return to the area where they were hatched. The birds leave their principal breeding grounds between August and October for wintering areas.

The diet of mountain plovers is primarily insects, particularly beetles, grasshoppers, and crickets. Foraging generally occurs in areas of extensive ground disturbance or areas where vegetation is less than one inch tall. Such areas include prairie dog towns, heavily grazed pastures, dirt or gravel roads, and recently plowed fields (Knopf 1996).

Project Area

Surveys for occurrence of mountain plovers on black-tailed prairie dog colonies were conducted on TBNG annually since 1993. During the 1997 survey a total of 26 adults and 20 juvenile plovers were seen within approximately 4,900 acres of prairie dog colonies surveyed (Byer USFS-TBNG unpub. report). Sites were recorded on either side of State Highway 450 and on the east side of State Highway 59. Mountain plovers were seen on one National Biological Survey breeding bird survey route (Newcastle) in Wyoming but none were reported on breeding bird survey routes in South Dakota.

[12] Federal Register: February 16, 1999, 64(30):7587-7601.

Mountain plovers have also been documented in annual wildlife monitoring reports on coal mines and nearby areas in Campbell County, Wyoming near the alternatives (WNDDB 1999).

3.18 SWIFT FOX

The historical range of the swift fox included the area between the Rocky Mountains on the west, the western border of Minnesota and Iowa on the east, west central Texas and eastern New Mexico on the south, and the southern regions of British Columbia, Alberta, Saskatchewan and Manitoba on the north. Today, the swift fox can be found in South Dakota, Wyoming, Montana, Nebraska, Colorado, Oklahoma, Kansas, New Mexico, Texas, and as reintroduced populations in Canada (Dunn 1977).

The swift fox is unafraid of man therefore it has been easily trapped and poisoned by efforts aimed at coyotes and wolves. Other factors affecting the decline of the swift fox include fragmentation or destruction of suitable habitat, interspecies competition, prey reduction by rodent control, hunting, and predation. Studies conducted in western Kansas and Colorado indicate predation by coyotes is as high as 87% among juveniles and 65% among adults. The swift fox was previously listed as endangered in 1970, but was removed from listing in the U.S. because of controversy over its taxonomy. However, it has remained listed in Canada. In 1995 a petition to list the swift fox as endangered in the northern part of its range was submitted to the USFWS. The USFWS concluded their listing as warranted, but precluded by higher listing priorities. The swift fox is currently federally listed as a candidate species (50 CFR Part 17).

The swift fox is currently state listed as endangered in Nebraska, threatened in South Dakota and protected in Wyoming. In contrast, they are still legally harvested in Colorado, New Mexico, Kansas, and Texas (Dunn 1997).

The fox occupies short- and mixed-grass prairies, and other arid areas and often inhabit prairie dog colonies (Carbyn 1993). Native grasses in this habitat include buffalo grass, blue grama, and western wheat grass. Shrubs present include sagebrush (*Artemisia* spp.) and saltbush (*Atriplex* spp.). Common sunflower (*Helianthus annuus*), western ragweed (*Ambrosia psilostachya*), and prickly pear occur in swift fox habitats that were previously cultivated. Soil in the area of the den ranges from clay-loam to sandy loam (Dunn 1997).

The fox excavates its own den or enlarges another animal's den. Denning sites of the swift fox are usually well-drained slopes or hilltops with short or sparse vegetation. The den usually has 3 to 4 entrances. Unlike other canids, swift fox use dens all year-round. This solitary fox seldom ventures more than 1.9 miles from its den (Dunn 1997).

The fox is nocturnal and an opportunistic feeder. Its diet includes rabbits, rats, mice, birds, insects, grasses, carrion, and berries. Studies conducted on the stomach contents of the fox show that a majority of its diet during the summer season is grasshoppers (Dunn 1997).

Pair bonds develop during October and November. The female swift fox is monoestrous, breeding from late December to February. Gestation is 51 days with 3 to 5 young born in March to April. The pups emerge from the den in one month and are weaned at 6 to 7 weeks. They are fully grown in 4 to 5 months with a life span of 8 to 10 years. Dispersal of pups begins in August and they are capable of breeding during the first breeding season following birth (Carbyn 1993).

Project Area

There are records of swift fox from the project vicinity in Custer and Fall River counties, South Dakota (SDNHDB 1998) and on the Wall Creek and Fall River Ranger Districts, BGNG (Hetlet and Hodorff 1997).

Recent surveys conducted in central and eastern Wyoming included sites in Weston, Campbell, Niobrara and Converse counties. Swift foxes have been recorded from Converse and Weston counties, roughly coinciding with distributions reported by trappers and USFS observations on TBNG (Woolley et al. 1995).

3.19 STURGEON CHUB

The sturgeon chub occurs throughout the Missouri River drainage and the lower Mississippi River (USFWS 1993c). Alterations of the larger rivers through impoundment, channelization, and snag removal that have reduced the amount of riffle habitats appear to be some of the causes of the decline of the sturgeon chub. These alterations have also resulted in changes to the historic hydrograph of the river, reducing or eliminating dramatic seasonal changes in flow. Releases from impoundments have altered the normal temperature of the river by reducing water temperatures that may be an important cue for spawning. Additionally, predation from picivorous sport fishes stocked in the Missouri River basin may be contributing to population declines. The sturgeon chub was federally listed as a Category 2 species in the 1980's. The sturgeon chub was reclassified as a Category 1 (Candidate) species in July 1994. USFWS is preparing documents that would recommend the species for listing as an endangered species (USFWS 1999b)[13].

This member of the minnow family inhabits shallow sand or gravel bottom zones in areas with strong currents in warm and highly turbid medium to large rivers (Lee et al., 1980). Little is known about overall life history of the sturgeon chub because their habitat makes detailed observation and study difficult (USFWS 1993c). The species is believed to live up to four years with both sexes maturing at 2 years of age (Stewart 1981, Werdon 1992). Spawning is expected to occur from June through July, depending on the location, with spawning occurring later in more northerly portions of the range (Stewart 1981, Jenkins 1980, Werdon 1992, Cross 1967). Fertilized eggs drift downstream, hatching in approximately one day. Young grow quickly until mature at 2 years, after which, growth slows (Stewart 1981, Werdon 1992). The diet of the sturgeon chub is larval aquatic insects (Collins et al. 1995).

Project Area

Sturgeon chub have been repeatedly documented in South Dakota in the Cheyenne River in Pennington and in Custer counties as recently as 1994 (USFWS 1993a, USFWS 1993b, SDNHDB 1998). A study conducted by SDSU, USGS and BRD in 1996 between Angostura Dam and Lake Oahe did not locate any sturgeon chub until sampling below Red Shirt, South Dakota where turbidity increased. No chubs were collected between the Angostura Dam and Red Shirt, South Dakota.

While their occurrence in the portion of the Cheyenne River proximate to Alternatives B and C for the new railroad has been demonstrated repeatedly, they may also still occur in tributary streams to the Cheyenne River, given collections made in similar stream habitats in Wyoming. Surveys were conducted during October 1999 in several tributary streams at or near proposed railroad crossing by Alternatives B and C. The sampled streams, all with flowing water, included Spring Creek, Rapid Creek, and Box Elder Creek (Pennington County); Cottonwood Creek, French Creek, Battle Creek (Custer County); and Hat Creek (Fall River County). No sturgeon chubs were collected at any of the sites.

In Wyoming, populations of sturgeon chub are only known to occur in the Powder River in Campbell County.

[13] Federal Register: January 18, 1995, 60(11):3613-3615.

3.20 BLACK-TAILED PRAIRIE DOG

Black-tailed prairie dog numbers once reached into the billions. They inhabited over 100 million acres of short-grass prairie. However, since the turn of the century, the black-tailed prairie dog has declined by 98% and its historic range has been reduced to less than one percent (Johnson 1997). It is estimated that only 700,000 acres of prairie dog habitat remain (NWF 1997a). Today, large complexes of black-tailed prairie dogs occur in only three states: Montana, South Dakota, and Wyoming (NWF 1997b). This decline is a result of habitat fragmentation through agriculture and urban development, active poisoning, population reduction through state and federally supported animal control programs, recreational shooting, and wildlife disease (Johnson 1997).

Prairie dogs are social animals and live in large colonies or towns in short- and mid-grass prairie. The colonies are further divided into wards by topographical barriers and finally into coteries. The coteries consist of one adult male, one to four adult females and any offspring less than two years of age. The prairie dog is diurnal and is active from sunrise to sunset. They excavate extensive tunnels and burrows for shelter and protection (Nowak 1991). The prairie dog's diet consists of grasses and forbs.

A prairie dog is sexually mature at approximately two years of age (Zoo. Soc. 1996). Breeding takes place in March and early April with gestation lasting approximately one month. Four to six young are born and stay in the burrow for six weeks (NGPC no date-b). Young males leave the coterie as juveniles and usually gain control of another coterie. Females stay in their natal coterie (Nowak 1991).

Prairie dogs play an important role in their ecosystem. Badgers, coyotes, weasels, golden eagles, hawks, black-footed ferrets and other predators feed upon the prairie dog. Additionally several species such as rabbits, other small rodents, burrowing owls, snakes and black-footed ferrets use vacant burrows. Mountain plover, grasshopper sparrows, and other ground nesting birds are found in greater numbers in prairie dog towns and native grasses are also more abundant (NGPC no date-b). The prairie dogs' continued survival is imperative to the federally endangered black-footed ferrets' survival. The USFWS has determined that the listing of the species is warranted but precluded by other higher priority actions[14].

Project Area

Black-tailed prairie dog colonies occur throughout the project area in western South Dakota and Wyoming. Black-tailed prairie dog colonies were mapped along Alternative C from black-and-white aerial photographs (1:2,400) extending to approximately 1,000 feet on each side of the alternative's centerline. Additional colonies have been mapped by the Forest Service (as current as 1998) and the WGFD mapped colonies through the late 1980's. Maps of colonies on private lands have been provided by county weed and pest control district agents in South Dakota and Wyoming. These data are compiled in Table 3-7 and show that all alternatives would affect prairie dog colonies but that Alternative C would cross the most colonies (a function of mapping effort conducted along that alternative). Mapped prairie dog colonies intersected by Alternative B are not as complete as for Alternative C since, except for those sections that coincide with or closely parallel Alternative C, no aerial photography exists along Alternative B.

The current activity status of each prairie dog colony is unknown: some colonies have become inactive due to sylvatic plague epizootics and others have been poisoned by county weed and pest control agents and/or private land owners. For most of the colonies that have been mapped there is no additional information about the extent or proximity of other colonies that would form a local colony complex.

[14] See Federal Register: February 4, 2000, 65(24):5476.

Table 3-7
Miles of proposed right-of-way under Alternatives B, C, and D that would intersect black-tailed prairie dog colonies in South Dakota and Wyoming

Alternative	State	Miles of Proposed ROW per Land Owner Intersecting Prairie Dog Colonies				
		USFS	BLM	State	Private	Total
B[1]	South Dakota	0.2	0	0	3.2	3.4
	Wyoming	1.7	0	1.5	4.9	8.1
	Total	**1.9**	**0**	**1.5**	**8.1**	**11.5**
C[2]	South Dakota	0	0	0.2	4.9	5.1
	Wyoming	1.7	0	1.6	9.1	12.4
	Total	**1.7**	**0**	**1.8**	**14.0**	**17.5**
D[3]	South Dakota	0	0	0.1	2.8	2.9
	Wyoming	0.3	0	0.2	2.8	3.3
	Total	**0.3**	**0**	**0.3**	**5.56**	**6.2**

[1] - Prairie dog colonies mapped from aerial photographs where Alternative B coincides with Alternative C, by USFS on TBNG, and by WGFD.
[2] - Prairie dog colonies mapped from aerial photographs, by USFS on TBNG, and by WGFD.
[3] - Prairie dog colonies mapped from aerial photographs where Alternative D coincides with Alternative C, by USFS on TBNG, and by WGFD.